

Benchmark Report

Interreg



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North-West Europe

More4Sustainability



Example Company



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1. Introduction More4Sustainability Framework

The first part of the benchmark report focuses on the development of sustainability. The MORE4Sustainability framework has been developed for this purpose. This framework consists of a number of layers: from strategic to operational.

As with any other business process, you should start from a sustainability strategy with a vision and strategic objectives (the orange focus field in the middle of the framework). In addition, sustainability strategies must be brought into line with what is expected from corporate sources: specific objectives, standards and reports.

Around it is a shell with four tactical focus areas, the gray tactical layer. The four tactical focus areas are:

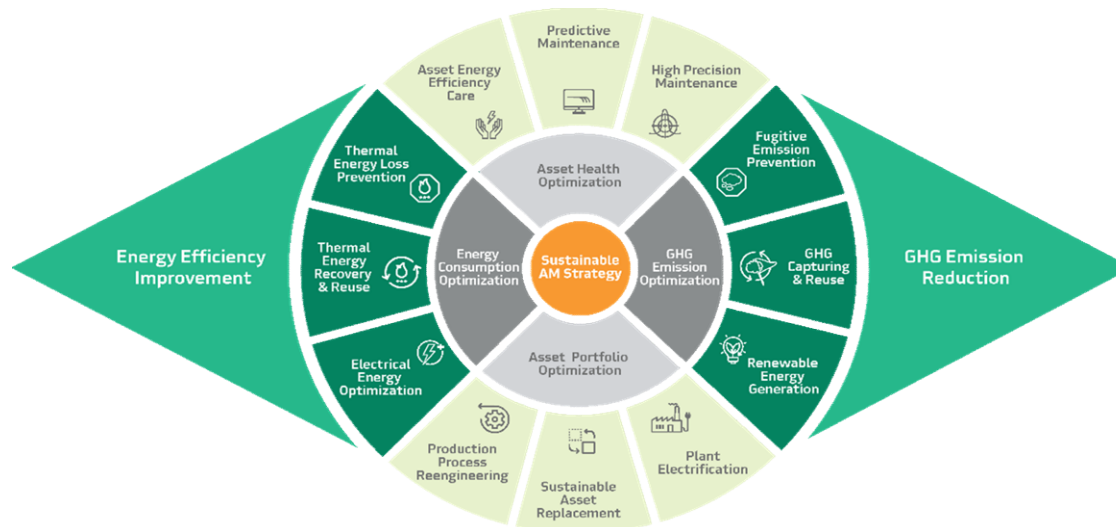
- Asset Health Optimization: Optimising the technical and operational condition of assets to avoid energy losses and unnecessary emissions;
- GHG Emission Optimization: minimizing greenhouse gas emissions from the entire production process (including internal energy generation);
- Asset Portfolio Optimization: Determining the right assets based on risk management to achieve sustainability objectives over the entire life cycle;
- Energy Consumption Optimization: Maximizing energy efficiency to achieve the desired performance with the least possible energy consumption.

From these tactical focus areas, the organization is set up for sustainability. This includes processes, IT management systems, norms or standards to be applied, the use of Artificial Intelligence (AI) and finally the education and training of employees within the various fields of interest. These are also called the tactical enablers for the organization.

The outer ring of the framework consists of twelve focus areas (the green fields of interest) that focus on the application of methods and technical solutions to reduce energy consumption or reduce CO2 emissions.

Finally, the fourth layer: that is the impact layer. On the left, the total impact of the applications from the framework on energy efficiency improvement is reflected. On the right, the impact on the reduction of greenhouse gas emissions.

Based on the elements of the MORE4Sustainability framework, your organization was examined the degree of implementation of the various methods and technical solutions, their impact on both sustainability goals and how they relate to the group of early adopters who participated in the MORE4Sustainability study. This benchmark information can be found in sections 2 to 5 of this benchmark report.



2. Self Scan - Focus Areas

	% Early adopters with full implementation	Implementation Level 2024	Target Implementation Level 2030	Description of action	Required Investment (€)	Additional annual costs (€)	Energy Efficiency Improvement 2030	GHG Emission Improvement 2030
1.1 Plant Electrification							Early Adopters = 1,5%	Early Adopters = 2,0%
1.1.1 Pumps	33%	0. Not Implemented	0. Not Implemented				0,0%	0,0%
1.1.2 Compressors	40%	0. Not Implemented	0. Not Implemented					
1.1.3 Heating elements	40%	0. Not Implemented	0. Not Implemented					
1.1.4 Vehicles and forklifts	53%	0. Not Implemented	0. Not Implemented					
1.1.5 Other	0%	0. Not Implemented	0. Not Implemented					
1.2 Sustainable Asset Replacement							Early Adopters = 5,3%	Early Adopters = 4,9%
1.2.1 Led Lighting	67%	3. Fully implemented	3. Fully implemented				7,0%	7,0%
1.2.2 Smart and adaptive lighting	47%	2. Roll out	3. Fully implemented					
1.2.3 High-efficiency HVAC	33%	2. Roll out	3. Fully implemented					
1.2.4 High-efficiency motors and drives	60%	2. Roll out	2. Roll out					
1.2.5 Life extension, refurbishment and overhaul	53%	2. Roll out	2. Roll out					
1.2.6 Circularity for sustainable replacement	40%	2. Roll out	2. Roll out					
1.2.7 Other	0%	0. Not Implemented	0. Not Implemented					
1.3 Production Process Reengineering							Early Adopters = 3,0%	Early Adopters = 2,1%
1.3.1 Process optimization and redesign	53%	2. Roll out	2. Roll out				5,0%	5,0%
1.3.2 Product conversion	27%	2. Roll out	2. Roll out					
1.3.3 (Partial) plant closure	7%	0. Not Implemented	0. Not Implemented					
1.3.4 Building (a partial) new factory	27%	3. Fully implemented	3. Fully implemented					
1.3.5 Circularity from process reengineering	13%	0. Not Implemented	0. Not Implemented					
1.3.6 Other	0%	0. Not Implemented	0. Not Implemented					
2.1 Asset Energy Efficiency Care							Early Adopters = 4,3%	Early Adopters = 3,2%
2.1.1 Regular cleaning	73%	2. Roll out	2. Roll out				2,0%	2,0%
2.1.2 Lubrication	60%	1. Pilot Implementation	3. Fully implemented					
2.1.3 Filter maintenance	60%	1. Pilot Implementation	3. Fully implemented					
2.1.4 Operator maintenance	47%	0. Not Implemented	2. Roll out					
2.1.5 Routine inspections	73%	1. Pilot Implementation	3. Fully implemented					
2.1.6 Monitor equipment settings	53%	1. Pilot Implementation	2. Roll out					
2.1.7 Other	0%	2. Roll out	2. Roll out					
2.2 Predictive Maintenance							Early Adopters = 1,8%	Early Adopters = 0,6%
2.2.1 PdM via condition monitoring	73%	1. Pilot Implementation	2. Roll out				0,0%	0,0%
2.2.2 PdM through integrative data analysis	33%	0. Not Implemented	2. Roll out					
2.2.3 PdM and prescriptive maintenance	33%	2. Roll out	3. Fully implemented					
2.2.4 Other	0%	0. Not Implemented	0. Not Implemented					
2.3 HighPrecision Maintenance							Early Adopters = 0,2%	Early Adopters = 0,1%
2.3.1 Precision measurement	27%		2. Roll out				0,0%	0,0%
2.3.2 Laser accurate alignment	33%		2. Roll out					
2.3.3 Accurate calibration of instruments	27%	2. Roll out	3. Fully implemented					
2.3.4 Managing high tolerances	27%		2. Roll out					
2.3.5 Quality assurance	13%		1. Pilot Implementation					
2.3.6 Clear maintenance instructions	33%	1. Pilot Implementation	2. Roll out					
2.3.7 Other	0%	0. Not Implemented	0. Not Implemented					

2. Self Scan - Focus Areas

	% Early adopters with full implementation	Implementation Level 2024	Target Implementation Level 2030	Description of action	Required Investment (€)	Additional annual costs (€)	Energy Efficiency Improvement 2030	GHG Emission Improvement 2030
3.1 Electrical Energy Optimization							Early Adopters = 4,9%	Early Adopters = 2,0%
3.1.1 HVAC optimisation	67%	1. Pilot Implementation	3. Fully implemented				1,0%	1,0%
3.1.2 Lighting upgrades	60%	3. Fully implemented	3. Fully implemented					
3.1.3 Motors and drives	53%	2. Roll out	3. Fully implemented					
3.1.4 Load balancing	33%		2. Roll out					
3.1.5 Power factor correction	33%	3. Fully implemented	3. Fully implemented					
3.1.6 Other	0%	0. Not Implemented	0. Not Implemented					
3.2 Thermal Energy Recovery & Reuse							Early Adopters = 3,6%	Early Adopters = 3,1%
3.2.1 Heat recovery systems	60%	2. Roll out	3. Fully implemented				8,0%	8,0%
3.2.2 Cogeneration systems	7%	0. Not Implemented	0. Not Implemented					
3.2.3 District heating and cooling	0%	0. Not Implemented	0. Not Implemented					
3.2.4 Integrate industrial processes	20%	2. Roll out	2. Roll out					
3.2.5 Thermal storage systems	7%	0. Not Implemented	0. Not Implemented					
3.2.6 Other	0%	0. Not Implemented	0. Not Implemented					
3.3 Thermal Energy Loss Prevention							Early Adopters = 2,5%	Early Adopters = 1,9%
3.3.1 Insulation	73%	2. Roll out	2. Roll out				3,0%	3,0%
3.3.2 Thermal imagingand infrared thermography	40%	1. Pilot Implementation	2. Roll out					
3.3.3 Temperature sensors	53%	1. Pilot Implementation	2. Roll out					
3.3.4 Other	0%	0. Not Implemented	0. Not Implemented					
4.1 Fugitive Emission Prevention							Early Adopters = 0,6%	Early Adopters = 0,8%
4.1.1 Leak detection and repair (LDAR)	20%	0. Not Implemented	0. Not Implemented				3,0%	3,0%
4.1.2 Sealing and repair	13%	0. Not Implemented	0. Not Implemented					
4.1.3 Emission control technologies	13%	0. Not Implemented	0. Not Implemented					
4.1.4 Other	0%	0. Not Implemented	0. Not Implemented					
4.2 GHG Capturing & Reuse							Early Adopters = 0,0%	Early Adopters = 0,0%
4.2.1 Capture technologies	7%	0. Not Implemented	0. Not Implemented				0,0%	0,0%
4.2.2 Transport and storage	0%	0. Not Implemented	0. Not Implemented					
4.2.3 Use and conversion	0%	0. Not Implemented	0. Not Implemented					
4.2.4 Biological conversion	7%	0. Not Implemented	0. Not Implemented					
4.2.5 Other	0%	0. Not Implemented	0. Not Implemented					
4.3 Renewable Energy Generation							Early Adopters = 3,3%	Early Adopters = 7,4%
4.3.1 Solar energy systems	67%		2. Roll out				4,0%	4,0%
4.3.2 Wind energy systems	47%	0. Not Implemented	0. Not Implemented					
4.3.3 Biomass energy systems	13%	3. Fully implemented	3. Fully implemented					
4.3.4 Geothermal energy systems	13%	0. Not Implemented	0. Not Implemented					
4.3.5 Other	0%	0. Not Implemented	0. Not Implemented					
Total							Early Adopters = 31,1%	Early Adopters = 28%
Total action plan - Focus Areas					€ -	€ -	33,0%	33,0%

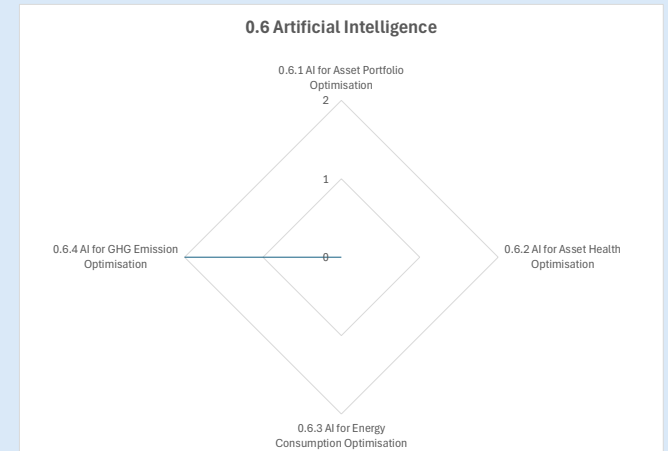
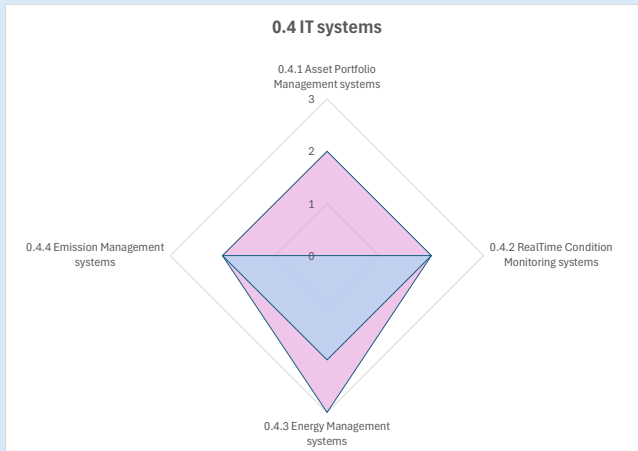
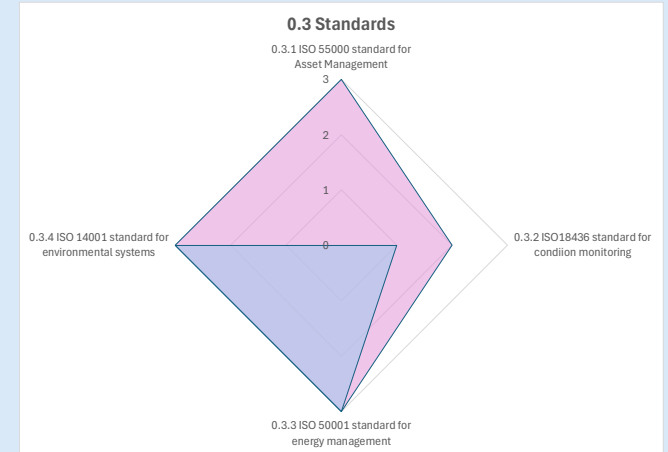
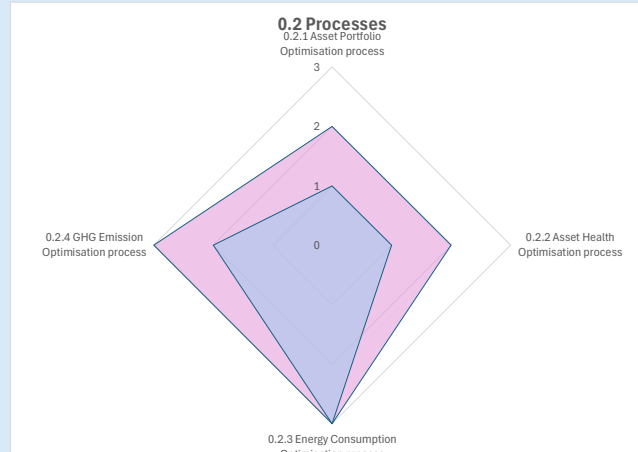
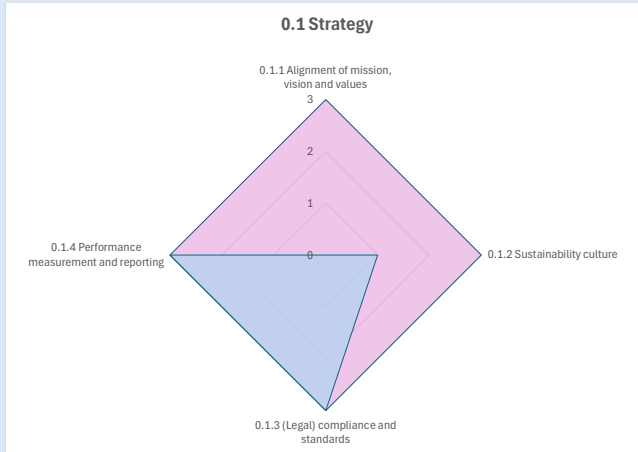
3. Self Scan - Strategy & Tactics

	% Early adaptors with full implementation	Implementation Level 2024	Target Implementation Level 2030	Description of action	Required Investment (€)	Additional annual costs (€)
0.1 Strategy						
0.1.1 Alignment of mission, vision and values	80%		3. Fully implemented			
0.1.2 Sustainability culture	73%	1. Pilot Implementation	3. Fully implemented			
0.1.3 (Legal) compliance and standards	73%	3. Fully implemented	3. Fully implemented			
0.1.4 Performance measurement and reporting	73%	3. Fully implemented	3. Fully implemented			
0.2 Processes						
0.2.1 Asset Portfolio Optimisation process	53%	1. Pilot Implementation	2. Roll out			
0.2.2 Asset Health Optimisation process	40%	1. Pilot Implementation	2. Roll out			
0.2.3 Energy Consumption Optimisation process	73%	3. Fully implemented	3. Fully implemented			
0.2.4 GHG Emission Optimisation process	40%	2. Roll out	3. Fully implemented			
0.3 Standards						
0.3.1 ISO 55000 standard for Asset Management	27%		3. Fully implemented			
0.3.2 ISO18436 standard for condition monitoring	33%	1. Pilot Implementation	2. Roll out			
0.3.3 ISO 50001 standard for energy management	33%	3. Fully implemented	3. Fully implemented			
0.3.4 ISO 14001 standard for environmental systems	47%	3. Fully implemented	3. Fully implemented			
0.4 IT systems						
0.4.1 Asset Portfolio Management systems	53%		2. Roll out			
0.4.2 RealTime Condition Monitoring systems	67%	2. Roll out	2. Roll out			
0.4.3 Energy Management systems	67%	2. Roll out	3. Fully implemented			
0.4.4 Emission Management systems	40%	2. Roll out	2. Roll out			
0.5 Staff training						
0.5.1 Staff training on Asset Portfolio Optimisation	47%		3. Fully implemented			
0.5.2 Staff training on Asset Health Optimisation	47%		2. Roll out			
0.5.3 Staff training on Energy Consumption Optimisation	67%	2. Roll out	3. Fully implemented			
0.5.4 Staff training on GHG Emission Optimisation	40%	2. Roll out	3. Fully implemented			
0.6 Artificial Intelligence						
0.6.1 AI for Asset Portfolio Optimisation	27%	0. Not Implemented				
0.6.2 AI for Asset Health Optimisation	27%	0. Not Implemented	0. Not Implemented			
0.6.3 AI for Energy Consumption Optimisation	40%					
0.6.4 AI for GHG Emission Optimisation	20%	0. Not Implemented	2. Roll out			
Total						
Total action plan - Strategy & Tactics					€ -	€ -

4. Sustainability Scan Diagrams

■ Status 2024
■ Target 2030

Implementation degree:
 0 - Not implemented
 1 - Pilot implementation
 2 - Roll out
 3 - Fully implemented

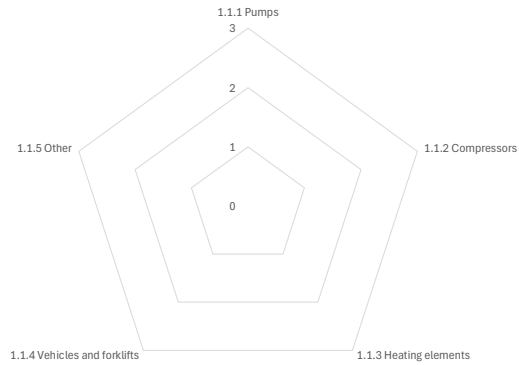


4. Sustainability Scan Diagrams

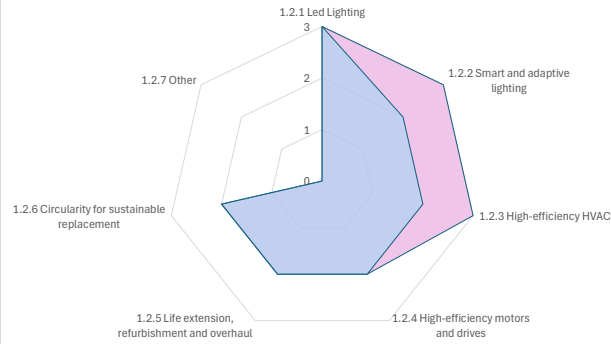
Status 2024
Target 2030

Implementation degree:
0 - Not implemented
1 - Pilot implementation
2 - Roll out
3 - Fully implemented

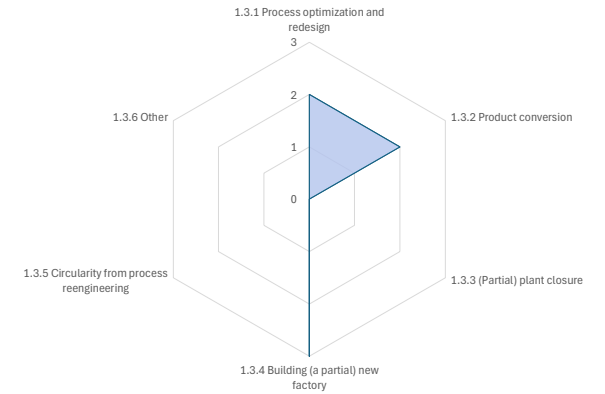
1.1 Plant Electrification



1.2 Sustainable Asset Replacement



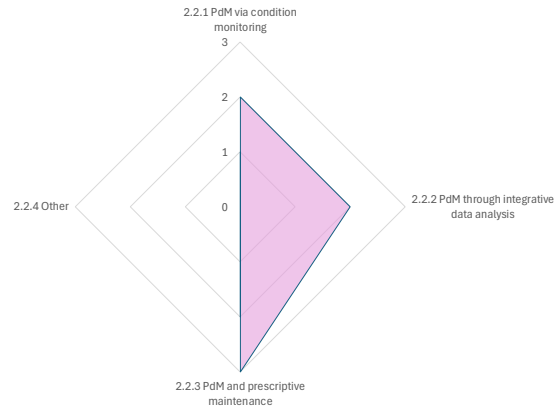
1.3 Production Process Reengineering



2.1 Asset Energy Efficiency Care



2.2 Predictive Maintenance



2.3 High Precision Maintenance

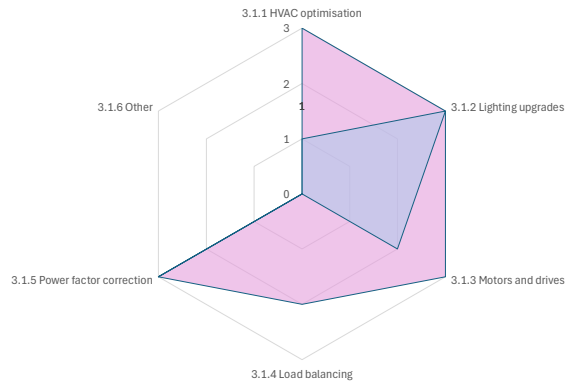


4. Sustainability Scan Diagrams

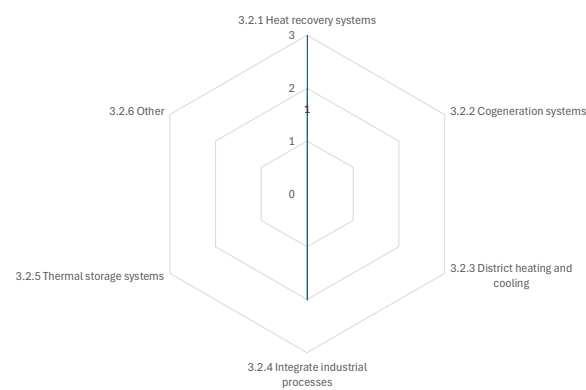
Status 2024
Target 2030

Implementation degree:
0 - Not implemented
1 - Pilot implementation
2 - Roll out
3 - Fully implemented

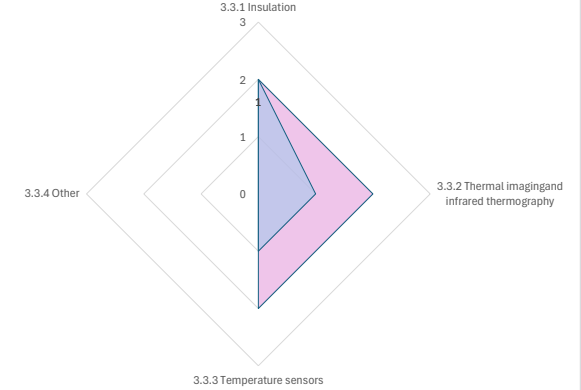
3.1 Electrical Energy Optimization



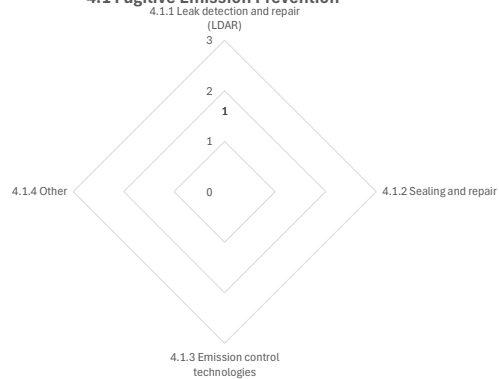
3.2 Thermal Energy Recovery & Reuse



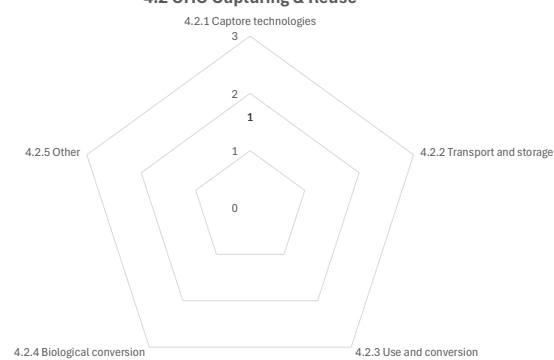
3.3 Thermal Energy Loss Prevention



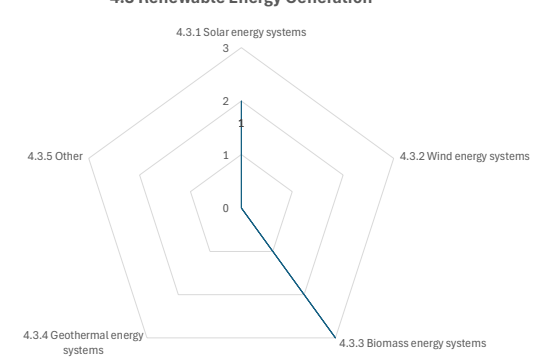
4.1 Fugitive Emission Prevention



4.2 GHG Capturing & Reuse



4.3 Renewable Energy Generation

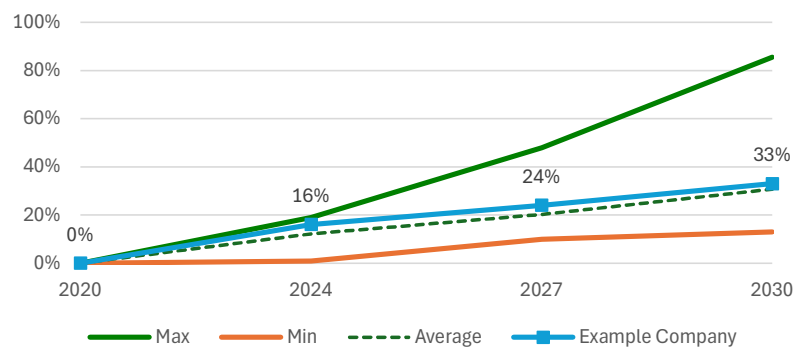


5. Sustainability Case

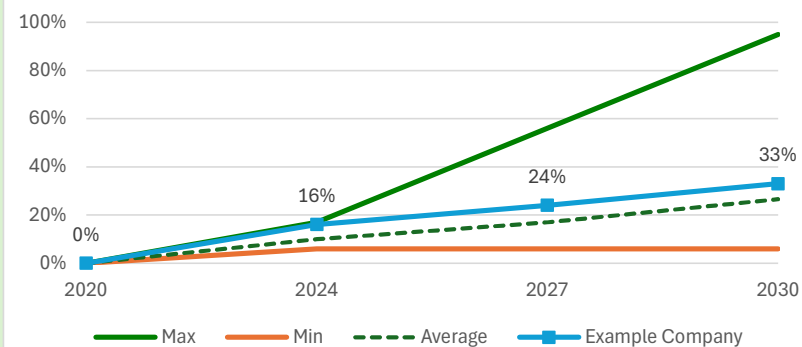
Energy Consumption 2024 (in GigaJoule)	Energy Efficiency Improvement 2030	Annual Saving in 2030 (in GigaJoule)
1.324.951	33,0%	437.234

Current GHG Emissions (in kTons CO2e)	GHG Emission Improvement 2030	Annual Saving in 2030(in kTons CO2e)
75	33,0%	25

Energy Efficiency Improvement



GHG Emission Improvement



In case you want to create a new Sustainability Case you can use the following link to the M4S Self-Assessment Tool:

Or you can use the following QR-code

<https://bit.ly/M4Sdownloads>



6. Maintenance & Asset Management benchmarking guidelines

In addition to benchmarking sustainability development, your performance in the field of maintenance and asset management is also examined. The VDMXL competence model and the associated KPIs are used for the benchmarking. VDMXL is a leading methodology for benchmarking and developing maintenance & asset management organizations; developed by Mainnovation.

The VDMXL competence model consists of twelve competencies. These competencies each cover a part of knowledge areas within the total scope of maintenance and asset management and one KPI is benchmarked for each competence:

Asset Utilization: Focuses on analyzing asset failures and developing solutions for technical availability;

Cost Control: Managing maintenance costs, identifying deviations and drawing up possible cost savings

SHEQ Control: Focuses on identifying and managing business risks and legal obligations

Capital Projects: Carrying out large investment projects and ensuring assets that meet the set standards and requirements

Asset Portfolio Management: Determine the asset base and determine the most optimal replacement strategies based on lifecycle developments

Reliability Engineering: Setting up new and optimizing existing preventive maintenance in line with asset management strategies

Planning & Scheduling: Planning and preparing maintenance activities to ensure efficient and safe execution

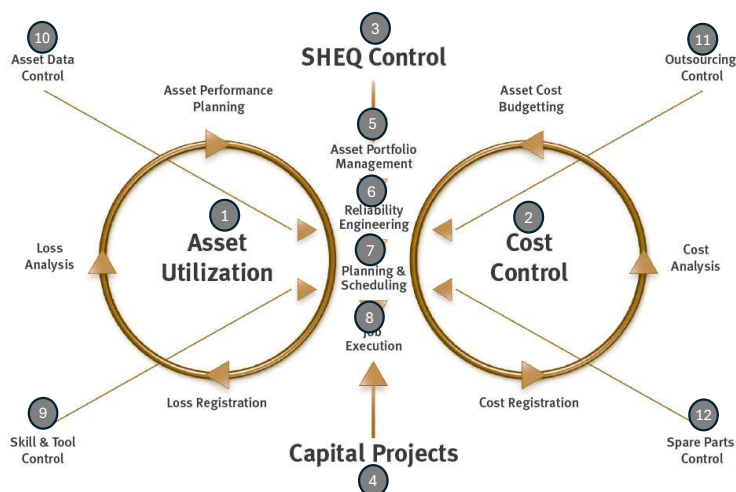
Job Execution: Performing maintenance work and providing feedback on the necessary maintenance information

Skill & Tool Control: Managing quantity and quality of the required resources within the maintenance & asset management organization in line with trends and developments

Asset Data Control: Managing asset-related documents and data and the associated standards and requirements that are set for them

Outsourcing Control: Setting up outsourcing strategies and managing outsourcing contracts

Spare Parts Control: Translating maintenance policies into required spare parts stocks



KPI	Definition
1. Maintenance costs/asset replacement value	Total maintenance costs (hours, materials, services) divided by the replacement value of the assets (assets and asset-related buildings).
2. Technical availability	Total available production time minus downtime due to maintenance divided by the total available production time.
3. Statutory inspections completed on time	Number of statutory inspections completed on time divided by the total number of legal inspections.
4. Average annual capital expenditures/asset replacement value	The average annual capital expenditures for technical modifications, replacements or lifetime extensions divided by the replacement value of the assets (assets and asset-related buildings).
5. Current age of assets/technical service life	The current age of the assets divided by the assets' technical service life. In case the asset base includes assets with varying services lives, the weighted average is used.
6. Preventive maintenance costs/total maintenance costs	Costs of preventive maintenance (hours, materials and services) divided by the total maintenance costs.
7. Scheduled work orders completed on time	Number of work orders completed on time divided by the total number of work orders. Work orders without a scheduled date are not taken into consideration.
8. Technician productivity	Total number of hours reported by technicians on asset-related work orders, divided by the total number of annual technician working hours.
9. Stock value of technical spare parts/asset replacement value	Total value of spare parts divided by the replacement value of the assets (assets and asset-related buildings).
10. Outsourcing costs linked to a contract/total outsourcing costs	The annual outsourcing costs linked to an existing contract divided by the total annual outsourcing costs.
11. Training costs/total personnel costs	Education and training costs divided by the total wage costs of the maintenance organization.
12. Assets with the right data in EAM system/total number of assets	The number of assets for which correct data is available in the EAM system divided by the total number of existing assets.

To benchmark the maintenance & asset management performance of your organization, the myVDMxl.com benchmark database of Mainnovation has been used. In doing so, your organization has been compared with industry peers or other companies with similar characteristics.

7. Maintenance & Asset Management Information

Maintenance & Asset Management Data	
Asset Replacement value (ARV)	€ 495.000.000
Building year plant	1976
Average age assets	17,5
Average Technical Life time	25
Assets with complete asset data	80%
Asset Health Index	0
Production loss due to maintenance	5%
Material Costs	€ 2.100.000
Labor Costs	€ 2.900.000
Outsourcing Costs	€ 2.843.000
Outsourcing costs with Contract	€ 740.000
Preventive maintenance costs	€ 4.000.000
Corrective maintenance costs	€ 4.000.000
Average Capital Allocation for maintenance projects (shutdown, TA, LTE)	€ 100.000.000
Inventory Stock value	€ 5.600.000
Planning compliance Capital Improvement & Extension projects	80%
% Projects Maintenance Ready	80%
Work orders finished as scheduled	80%
Technician productivity	50%
Training Costs	€ 35.000
Size of Maintenance Crew	55
Number of maintenance safety incidents (= integrity incidents and incidents during maintenance work)	0
% Legal inspections finished in time	95%

Maintenance & Asset Management KPI's	
Assets with complete asset data	80%
Relative age of assets	70%
SHEQ compliance	95%
Outsourced cost with contract	26%
Technical availability	95%
Preventive maintenance rate	50%
Maintenance Costs/ARV	1,6%
Work orders completed on time	80%
Annual training costs/Labor costs	1,21%
Capital expenditures/ARV	20,20%
Technician productivity	50%
Spare parts stock value/ARV	1,13%

8. Maintenance & Asset Management Benchmark Graphs

■ Score of your company (no 1)
■ Scores of industry peers (no 2-10)

